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anths, because these would settle the matter beyond doubt. As it is, I fear the determination will have to be considered provisional." The plant was collected on the face of a granite cliff overhanging the Brazos River, associated with *Selaginella Underwoodii* and various lichens and mosses. The genus is not reported from Colorado, but Brazos Canyon is not more than 25 miles south of the Colorado line.

U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

SYSTEMATIC AND ECOLOGICAL NOTES ON THE MOSSES OF WESTERN PENNSYLVANIA

O. E. JENNINGS

I. GENERAL NOTES

When the writer took charge of the botanical work in the Carnegie Museum in 1905 the need of bryological investigations in the region of Western Pennsylvania was at once apparent. Aside from the collections of Burnett in McKean County, of Linn & Simonton in Washington County, and of various scattered collections of Porter and of James, very little was known of the moss-flora of the region. In fact, the mosses of Eastern Pennsylvania, and of Ohio on the west, were much better known than those of Western Pennsylvania.

In connection with the general exploration of Western Pennsylvania for botanical specimens of all kinds, the writer has taken the opportunity for collecting much bryological material and, with the accumulation of this material, the specimens have been carefully studied and placed in the herbarium and, finally, as thesis work, there has been prepared a local manual[1] covering the mosses of Western Pennsylvania and adjacent territory. This manual was published in accordance with the requirements for a thesis, but that future investigation will add very greatly to its contents is a certainty, and that some conclusions therein reached will be found erroneous is a probability. It may be of some interest to call attention to some of the points brought out in the course of the preparation of the manual, as well as to refer to more recent finds.

In Porter's "*Catalogue of the Bryophyta and Pteridophyta found in Pennsylvania*" only 3 species of *Sphagnum* are reported for Western Pennsylvania. The herbarium at the Carnegie Museum now has 20 species and several varieties, if the writer has succeeded in properly identifying them, about as many as had been reported in the Catalogue for the whole state. It is interesting to note that, although the larger part of western Pennsylvania is unglaciated and has a rapid and thorough drainage, thus leaving few swamps or ponds, there are nevertheless a number of the species fairly well distributed in the region: *Sphagnum affine* R. & C. has now been found in eight counties, and *S. recurvum* (Beauv.) Warnst. in six. The best region for Sphagnums has been the Pymatuning Swamp in northwestern Pennsylvania, although a number of species have turned up

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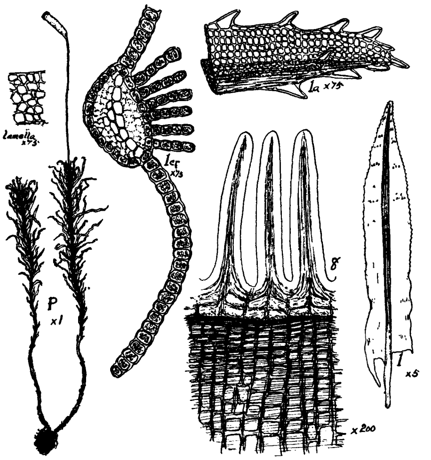
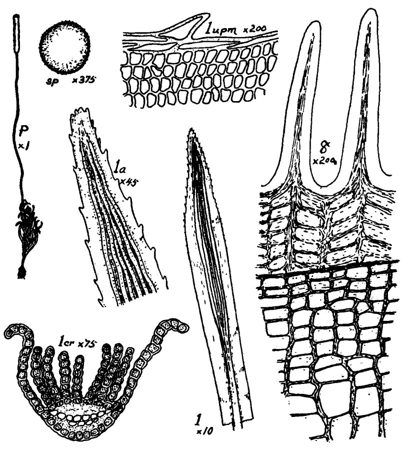
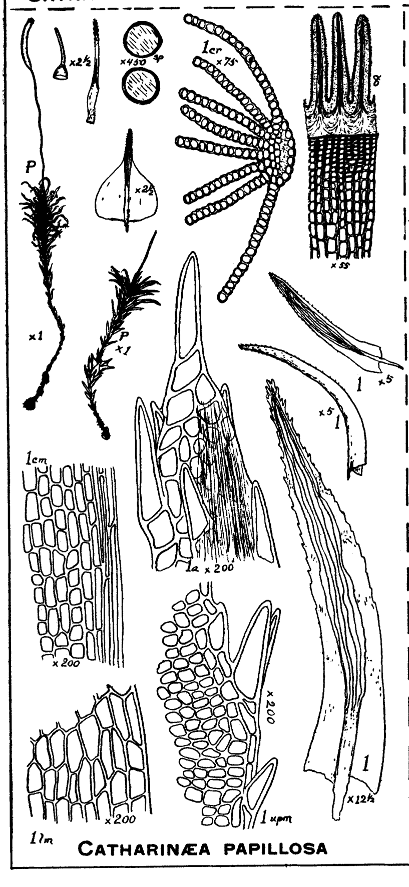
[1] A Manual of the Mosses of Western Pennsylvania. 1913. 375 pages of text and 54 pages of figures.



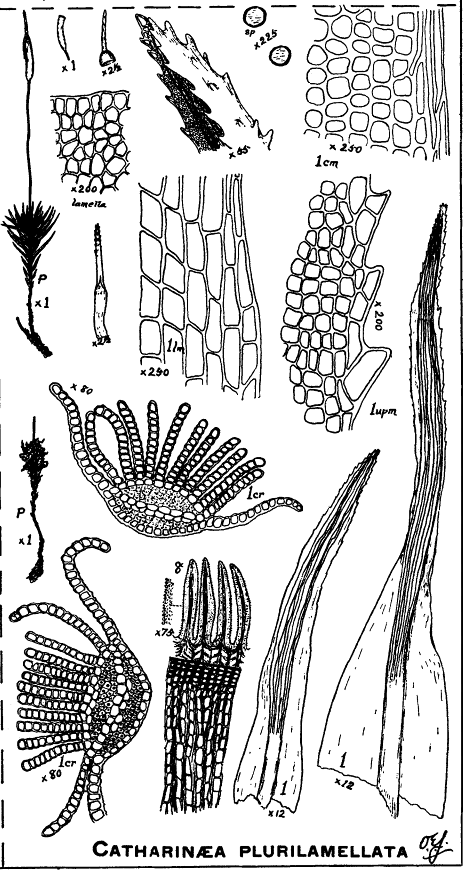
CATHARINÆA UNDULATA VAR. MINOR



CATHARINÆA ANGUSTATA



CATHARINÆA PAPILLOSA



CATHARINÆA PLURILAMELLATA

unexpectedly in moist cavities along the beds of some of the swiftly running mountain streams.

Polytrichum Ohioense R. & C. has now been collected in fourteen counties of Western Pennsylvania; *P. commune* (L.) Hedw. from seventeen. *P. strictum* (Banks) Menzies has been found in a small *Cassandra* bog in the Pymatuning Swamp and what appears to be a rather sickly specimen of the same species was collected in the midst of a large tuft of *Leucobryum* from a hill-top in Washington County. *P. piliferum* (Schreb.) Hedw. is now accredited to three counties.

The Catharinaeas proved particularly puzzling, there being apparently a couple of undescribed species rather common in the deep shaded ravines of the region. Some of these specimens have from 7 to 12 lamellae of 8 to 14 cells height and covering about two-thirds to three-fifths of the upper leaf width. In the manual the writer proposed two new species based on these forms. What was taken to be the true *C. angustata* (Brid.) Brid. is rather rare in Western Pennsylvania. Since the publication of the Manual, however, more material has been secured and it appears that there is a pretty complete series of intergradations between the plants called *C. angustata, papillosa*, and *plurilamellata.* (*See* Plate II, taken from the Manual of the Mosses of Western Pennsylvania, p. 402, *Plate XXVII.*)

Buxbaumia aphylla L. was sought for in vain for several years, although reported from the northern part of the region (Cameron County) in Porter's Catalogue. Finally, however, Mrs. Jennings, in 1910, located a few specimens under beech and hemlock trees on the banks of a little ravine about forty miles north of Pittsburgh, and early in May, 1913, Prof. A. R. Hillard of the Edgewood High School collected it about eighty miles northeast of Pittsburgh. On May 17, 1913, the present writer found it on bare clay banks along the roadside on the slopes of Chestnut Ridge about forty-five miles east of Pittsburgh. In the last named locality it appeared to be growing on soil covered by the protonema of *Pogonatum* and associated with *Webera sessilis* (Schmidt) Lindb. There are at least eleven localities now known for *Buxbaumia* in the state of Pennsylvania. *Webera sessilis* has now been found in about half a dozen places in Western Pennsylvania; but always on clay roadside banks in the mountains.

An interesting find of 1913 was the discovery in two places in the Pittsburgh district of *Pleuridium alternifolium* (Kaulf.) Rabenh., April 20 and 24, respectively. In both instances the moss was discovered growing in sandy-clay soil in hillside meadows. So far as known to the writer this species has not before been reported in Pennsylvania, although *P. subulatum* (L.) Rabenh. has been reported about twenty-five miles southwest of Pittsburgh.

Lesquereux's Slippery Rock Creek station for *Bryoxiphium* has been searched for in vain and it is not improbable that man's activities in that region in quarrying the excellent "Homewood" sandstone along the stream may have destroyed the habitat.

Probably the most generally distributed moss in Western Pennsylvania is *Dicranella heteromalla* (L.) Schimp. The writer's collections for this species number over ninety localities all over the region, and this represents only a small fraction of the stations where it has been recognized. One of the next most common species of the region is *Stereodon imponens* (Hedw.) Brid., to be found in woods everywhere, on humus and logs, or even on rocks. This is called "log moss" by our local florists and is collected in quantities for decorative purposes, particularly for Christmas work.

II. Ecological Distribution of the Mosses of the Pittsburgh District

Upon taking up the study of the distribution of plants in the Pittsburgh district it was soon found that the various ecological groups were located in habitats which could best be classified upon the basis of the physiography of the region. The Pittsburgh district, for the purposes of the following classification, has been limited to the hilly country lying within a radius of about thirty miles of Pittsburgh, Pa. The district is at the present time hilly, non-glaciated, partly forested, ranging in elevation from seven hundred to about thirteen hundred feet above the sea, and having in general a rather poor soil resulting from the disintegration and erosion of the Carboniferous shales and sandstones. There is a general lack of limestones or other rocks than the shales and sandstones mentioned, and this has considerable to do with the determination of the species occurring in the district.

The physiographic features of the Pittsburgh district are the result of a development which may be briefly summarized in the following manner: In Tertiary times the district was evidently a plain, but little elevated above the sea. Later this plain was elevated and the drainage systems began its erosion and dissection. This dissection continued until, at the beginning of the Glacial Period, the drainage system had evidently worked out a series of wide valleys about 300–350 feet below the horizon-line of the old plain. The drainage system, known as the "Old Monongahela System,"[1] flowed northward into the region now occupied by the basin of Lake Erie.

During the Glacial Period the ice moved southward to a point within about 35 miles of Pittsburgh, thus blockading and damming up the Old Monongahela. The impounded waters south of the ice finally escaped to the west over a low divide and, by subsequent erosion, the present Ohio River developed, diverging to the west and southwest from the course of the Old Monongahela at a point about 25 miles north of Pittsburgh. With the opening up of the Ohio River outlet, and possibly also a further elevation of the region, the river began again a period of erosion, cutting its channel considerably deeper. This new cycle of dissection has now resulted in a deepening of the channels of all of the larger streams to about 200 feet below the old preglacial channels. However, if one ascends the smaller streams and tributaries it is found almost invariably that the valley suddenly narrows into a ravine or gorge with swiftly-flowing and actively eroding waters, often forming rapids or falls, while above this region of active erosion the streams are still flowing in approximately the same valleys as in the time of the old Monongahela System.

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[1] Leverett, Frank. "Glacial Formations and Drainage Features of the Erie and Ohio Basins." U. S. Geol. Surv. Monograph **41**: 88: 100. 1902.

It has been comparatively easy to recognize the larger plant societies in the Pittsburgh district by relating the vegetation to the physiographic development of the habitat. However, it has not been so easy to definitely designate ecologically the habitats and societies of the mosses of the district. This is evidently largely due to the dependence of the mosses more or less directly upon larger plants; as in bark mosses and mosses growing on decaying logs. Not only will mosses be influenced by the general ecological features of the habitat, such as heat, light, moisture, exposure, nature of the soil, etc.—such factors as are all-important in determining the major plant societies—but the very existence of the mosses may be determined by the absence or presence of certain other plants upon whose live trunks they may grow, or upon whose decaying wood they are restricted, or upon whose shade-giving moisture-conserving habits they are dependent. It would thus appear that the sum total of ecological factors which may determine the absence or presence of a moss may be even greater than is the case with most of the plants of larger size in the same habitat. On the other hand, many mosses are not so restricted as are many of the larger seed plants and ferns because of their independence of direct connection with the soil; *Stereodon imponens* being a good example of such a moss.

In the following classification of the mosses of the Pittsburgh district the attempt has been made to group them under the ecological societies determined for the larger seed-plants and ferns by the physiographic development of the habitat.[1] Those species of mosses particularly characteristic of the habitat or particularly abundant in the habitat have been indicated by an asterisk. It is fully realized that the classification as proposed is not yet perfect, and further investigations may lead to radical changes.

1. *Quercus alba* Association. White Oak Forest.

This forest covers the rounded tops and upper slopes of the hills everywhere in the district, the soil being usually rather thin, infertile, and often quite acid, so that the area has not been so largely cleared for farming purposes as have some of the lower slopes and valleys. In this forest occur several of the huckleberries (*Vaccinium*), the trailing arbutus (*Epigaea*), etc., while the following mosses are common there:

A. On the ground.

Ceratodon purpurascens (Hedw.) Jenn.
Dicranella heteromalla (Dill.) Schimp.
Leptobryum pyriforme (L.) Wils.
Leucobryum glaucum (L.) Schimp.*
Polytrichum Ohioense R. & C.
Webera nutans (Schreb.) Hedw. (*Pohlia nutans* Lindb.)

B. On base of White Oak (and Chestnut Oak).

Anomodon attenuatus (Schreb.) Hueben.
Anomodon minor (Hedw.) Fuernr. (*A. obtusifolius* Bryol. Eur.)

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[1] Jennings, O. E. "A Note on the Ecological Formations of Pittsburgh and Vicinity." Science, N. S. **27**: 828–830. May 22, 1908.

Anomodon rostratus (Hedw.) Schimp.*
Leskea obscura Hedw.
Pylaisia Schimperi Card. (*P. intricata* Bryol. Eur.)

2. *Acer saccharum-Fagus grandifolia.* Maple-Beech Forest.

This forest occurs locally in the old pre-glacial valley floors at the present altitude of about one thousand feet above the sea, and it probably once prevailed in this habitat. It extends up the bases of the gentle slopes to meet the slightly intermingling White Oak forest of the hill-tops and upper slopes. Most of the Maple-Beech forest has been cleared away, the soil being generally fertile and fairly well drained. So far as determined this forest has practically the same mosses as occur in the forest of the shaded slopes, mentioned below under "5," but not quite so well developed, probably because of less dense shade and less moisture.

3. *Tsuga canadensis* Association. Hemlock Forest.

This forest occupies the dark, damp, cool, rocky ravine or gorge where the stream is now actively deepening its channel, and usually is best developed in the Pittsburgh district in the upper third of the smaller "runs," at an altitude of about 950–975 feet above sea-level. The flora of this habitat is rather limited, where best developed the Hemlock being the only tree, and the lower herbaceous plants being very few. The moss flora is fairly large, although it would undoubtedly be considerably larger were the walls of the gorge of other than the usual crumbling clay shales and soft sandstones.

A. On dripping rock faces of gorge or at falls.

Dicranella heteromalla [Dill] Schimp. Not common in this habitat.
Hymenostylium curvirostre [Ehrh.] Lindb. (*Gymnostomum curvirostre* [Ehrh.] Hedw.*)
Philonotis Muhlenbergii (Schwaegr.) Brid.*

B. Damp shaly cliff of gorge.

Barbula unguiculata [Huds.] Hedw.
Grimmia apocarpa [L.] Hedw.
Webera nutans [Schreb.] Hedw. (*Pohlia nutans* Lindb.)

C. Calcareous rock cliff in gorge: very limited in extent.

Fissidens minutulus Sull.

D. Narrow non-calcareous rock ledges in gorge.

Brachythecium flagellare (Hedw.) Jenn.

E. Stones in bottom of ravines and gorge.

Amblystegium Juratzkanum Schimp.
Amblystegium varium (Hedw.) Lindb.
Brachythecium flagellare (Hedw.) Jenn.
Fissidens exiguus Sull.
Fissidens minutulus Sull.

4. *Quercus velutina–Q. coccinea* Association. Black Oak–Scarlet Oak Forest.

On the remnants of the flood-plains and terraces of the main streams of the Old Monongahela System the soil is a deep rather rich gravelly or sandy alluvium on which the forest is mainly Black Oak and Scarlet Oak, with quite a mixture of other species. There is very little of this forest left undisturbed in the district owing to its desirability both for agricultural purposes and, in the neighborhood of the cities, for residential purposes. The altitude is about 900 feet above the sea and much of the best residential section of Pittsburgh is located here. The mosses are evidently about the same species as those listed under "5," being mainly those confined to logs, humus, or bases of trees.

5. *Betula-Acer-Fagus-Quercus* Association. Birch-Maple-Beech-Oak Forest.

Below the gorge, where the stream is eroding most rapidly, the valley widens out and, eventually, there result more or less gentle slopes, broken up here and there by side ravines and by landslides, or here and there under-cut by the stream, which may be beginning to meander in the widening flood-plain. The forest is a difficult one to briefly characterize. The nature of the slopes varies in steepness and in exposure, and this is to a measure expressed in the varying vegetation. In general the most prominent trees are the Cherry Birch, Red Maple, Beech, and Black Oak, with here and there a prominent mixture of Red Elm, Black Cherry, Locust, Sour Gum, White Ash, Tulip Tree, Basswood, and White Oak. The soil is usually quite unstable, always working down slope and thus often being a mechanical mixture of stones, clay, decaying leaves, sticks, etc. The moss flora of this forest is better developed than that of any of the other habitats:

A. Shaded clay soil on slopes.

Campylium chrysophyllum (Brid.) Bryhn.
Catharinaea angustata Brid.*
Catharinaea undulata [L.] W. & M.* and var. *allegheniensis* Jenn.*
Dicranella heteromalla [Dill.] Schimp.
Ditrichum pallidum [Schreb.] Hampe.
Ditrichum tortile [Schrad.[Brockm.
Mnium cuspidatum L., Hedw.
Physcomitrium turbinatum (Rich.) C. M.
Webera nutans [Schreb.] Hedw.

B. Woods humus or humus-covered soil on shaded slopes.

Amblystegium Kochii Bryol. Eur.
Mnium cuspidatum L., Hedw.*
Plagiothecium denticulatum [L.] Bryol. Eur.*
Plagiothecium sylvaticum [Huds.] Bryol. Eur.
Platygyrium repens [Brid.] Bryol. Eur.
Rhynchostegium serrulatum (Hedw.) Jaeg.*
Stereodon imponens (Hedw.) Lindb.*
Stereodon Haldanianus (Grev.) Lindb.
Thuidium delicatulum [L.] Mitt.*

C. Logs on shaded slopes.

Brachythecium acuminatum (Hedw.) Kindb.
Brachythecium campestre (Bruch) Bryol. Eur.

Brachythecium salebrosum [Hoffm.] Bryol. Eur.
Dicranella heteromalla [Dill.] Schimp.
Entodon cladorrhizans (Hedw.) C. M.
Tetraphis pellucida [L.] Hedw. (*Georgia pellucida* Rabenh.)
Mnium cuspidatum L., Hedw.
Platygyrium repens [Brid.] Bryol. Eur.*
Rhynchostegium serrulatum (Hedw.) Jaeg.*
Stereodon imponens (Hedw.) Lindb.
Stereodon Haldanianus (Grev.) Lindb.
Thuidium delicatulum [L.] Mitt.*
Thuidium minutulum [Hedw.] Bryol. Eur.

D. Loose sandstone blocks on shaded slope.

Hedwigia ciliata Ehrh., Bryol. Eur. (*H. albicans* Lindb.)

Dianthera Association. Water Willow Association.

6. The forest of the flood-plains of the rivers and larger tributaries is the result of a succession of ecological groups which can still be made out to a large extent from scattered remnants. This succession may best start with a sandbar or a bit of shallowly submerged bank. If for any reason the water becomes shallow beyond a certain limit the Water Willow takes possession and the vegetational succession then starts with the *Dianthera Association.* Some of the aquatic mosses might be expected here, but none have been reported from this association thus far. The *Dianthera* acts as an obstacle to slow down the water currents, thus leading to a greater deposition of sand and silt at that point, as well as directly stopping much moving material. In this way the water becomes successively more shallow and eventually conditions become suitable for the sprouting and rooting of other plants which will take possession of the habitat in place of the disappearing *Dianthera.* The plant group following the *Dianthera* may be known as follows:

7. *Platanus-Salix* Association. Sycamore-Willow Forest.

This association is rarely of any great extent and probably very rarely lasts more than one generation of willows, excepting at the edge of a rather permanent bank, where subject to severe floods. Ordinarily the level of the soil raises to some extent with the development of the plants and conditions then speedily become suitable for the next following association. The following mosses are to be counted as members of this association, more particularly along the sandy banks of the tributaries of the larger rivers:

Aphanorhegma serratum (Hook. & Wils.) Sull.
Physcomitrium immersum (Rich.) C. M.
Pogonatum pennsylvanicum (Hedw.) Paris. (*P. brevicaule* Beauv.)

8. *Acer saccharinum—Ulmus americana* Association. Silver Maple—White Elm Forest.

This forest, with a large number of other trees besides the Silver Maple and White Elm, seems to be the prevailing type in the few scattering remnants of the original woods of the habitat. Among the other trees to be mentioned are Hard Maple, Red Maple, Tulip Tree, Walnut, Hickory, Swamp White Oak, Red Oak, and, in fact, quite a large list of species, with also occasional old Sycamores, which may be considered as relicts of the preceding association. The indications are that the moss flora was about the same as in the woods of the ravine slope (*see* "5 ') and it was probably even richer.

There would be good reason to believe that this Silver Maple-White Elm forest would eventually give way to a Hard Maple-Beech forest, but the writer has seen no examples of such woods, even though they may have been present a century ago.

9. *Sambucus racemosa—Hydrangea arborescens* Association. Red-Berried Elder—Wild Hydrangea Thicket.

This thicket occurs on the precipitous talus slopes along the larger streams where extensive under-cutting has taken place. There are a number of good examples of such talus slopes along the Allegheny River above Pittsburgh. The soil is very unstable, landslides of various sizes being of frequent occurrence. The steeper slopes are usually mainly covered by a thicket with a small scattering of trees, but after the cessation of undercutting the slope may become more stable and, eventually, the thicket will give way to a diversified forest probably best characterized by Basswood and Red Elm, and this steep slope would in time become more gentle and pass into a forest of about the same character as that of the ravine slopes, the Birch-Maple-Beech-Oak forest.

On the face of the steep talus slope there are numerous small ledges and rock-crevices to which the moss flora is mainly confined. The list is usually about as follows:

Bryum affine (Brid.) Lindb.
Bryum intermedium (Ludw.) Brid.
Bryum pallescens [Schleich] Hedw.
Ceratodon purpurascens (Hedw.) Jenn.
Dicranella varia (Hedw.) Schimp.
Funaria hygrometrica [L.] Hedw.
Leptobryum pyriforme [L.] Wils.
Webera nutans [Schreb.] Hedw. (*Pohlia nutans* Lindb.)

10. *Philonotis* Association.

On the wet rock bottom of the more open ravine below the gorge, where often submerged in rainy periods, *Philonotis Muhlenbergii* and *P. fontana* so often form the most conspicuous vegetation that it has been thought best to name the association after them. The vegetation in this habitat is, in fact, mainly mosses, there being also *Marchantia* and *Conocephalus*, with a very few seed plants in the crevices. *Selaginella apus* is found here quite frequently. The moss list is as follows:

Amblystegium orthocladon (Beauv.) Jaeg.
Calliergon cordifolium [Hedw.] Kindb.

Hygroamblystegium tenax (Hedw.) Jenn. (*Amblystegium irriguum*, Bryol. Eur.)

Mnium affine var. *rugicum* (Laur.) Bryol. Eur.

Philonotis fontana [L.] Brid.*

Philonotis Muhlenbergii (Schwaeg.) Brid.*

In addition to the various associations mentioned above there are a number of ecological plant groups which, by reason of man's activities, have replaced the natural vegetation over a large part of the district. Such vegetation is ecologically termed "secondary." The main secondary vegetational groups, as far as their mosses have been noted, are as follows:

11. Roadside-bank Formation.

This formation is the one covering the clay roadside banks where not too much exposed to the sun. The Horned Liverwort, *Anthoceros laevis* L., is quite common in this habitat, together with the following mosses:

Catharinaea undulata [L.] W. & M.*

Catharinaea undulata var. *allegheniensis* Jenn.

Pogonatum pennsylvanicum (Hedw.) Paris. (*P. brevicaule* Beauv.)*

12. *Bryum argenteum* Association.

On paths and old camp sites on the modern flood-plains where recent use has kept down the grass and other herbaceous vegetation the most conspicuous vegetation is the moss vegetation, dominated usually by the Silvery Bryum.

Bryum argenteum (L.) Hedw.*

Dicranella heteromalla [Dill.] Schimp.

Funaria hygrometrica [L.] Hedw.

Physcomitrium turbinatum (Rich.) C. M.

13. Cultivated Field Formation.

So far as the present list of mosses is concerned this formation refers mainly to cultivated fields on the pre-glacial flood-plains and slopes at an altitude of one thousand feet or more. Meadows, pastures, and various other fields where cultivation has been more or less recent are, for sake of convenience, grouped together under this head. The moss flora here differs but little from that of the preceding group.

Dicranella heteromalla [Dill.] Schimp.*

Funaria hygrometrica [L.] Hedw.

Physcomitrium turbinatum (Rich.) C. M.

14. Meadow-Pasture Formation on the Recent Sandy Flood-plains.

This group differs from the preceding in that it occupies the sandy flood-plains along the larger streams and rivers at an altitude of about 750–800 feet.

Ceratodon purpurascens (Hedw.) Jenn.

Dicranella heteromalla [Dill.] Schimp.

Physcomitrium turbinatum (Rich.) C. M.

Webera Lescuriana (Sull.) Jaeg.

15. *Funaria-Physcomitrium* Association.

This association often occurs pure and forms a dense covering on otherwise bare ash-covered spots where there has been a recent wood fire, such as a spot where a brush-heap has been burned. Of the two mosses constituting the association *Funaria* is usually the most abundant.

Funaria hygrometrica [L.] Hedw.*
Physcomitrium turbinatum (Rich.) C. M.

CARNEGIE MUSEUM, PITTSBURGH, PA.

BUCEGIA, A NEW GENUS FOR NORTH AMERICA

CAROLINE COVENTRY HAYNES

It is a great pleasure to announce the addition to our Flora of this genus, *Bucegia*, hitherto known only in the Carpathian Mountains of Roumania.

Mr. A. H. Brinkman collected it along with many other interesting species in the sub-alpine regions of British Columbia. Dr. Conklin is naming these, the Herbarium of the Sullivant Moss Society, as well as my own, getting a very full set. I have had the pleasure of studying a great many of the specimens with

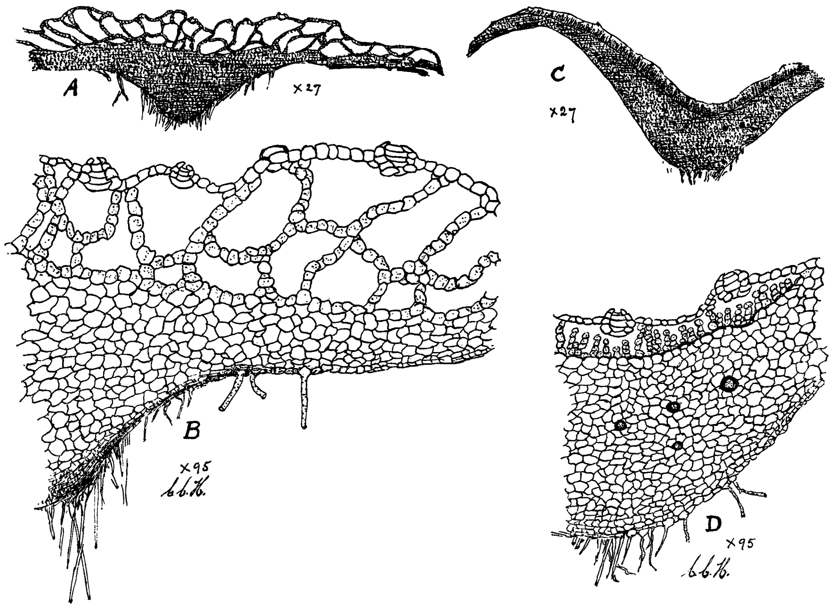

FIGURE 1.
A and B, *Bucegia romanica* Radian.
C and D, *Preissia quadrata* (Scop.) Nees.

Shorter Notes. G. K. Merrill; H. E. Hasse; A. LeRoy Andrews; J. W. Huntington; O. E. Jennings; and E. B. Chamberlain. 29–32, 43, 63–64, 80, and 90–95
Sullivant Moss Society Notes. E. B. Chamberlain.........32 and 96
Some Mosses from Monroe County, Indiana. F. L. Pickett......33–34
Systematic and Ecological Notes on the Mosses of Western Pennsylvania. O. E. Jennings....83–93
The Philadelphia meeting of the Sullivant Moss Society. E. B. Chamberlain................17–19
The Usneas of the World. 1752–1914. Part II.—South America. R. Heber Howe, Jr. (*Map p. 55*)............38–43 and 52–63

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ERRATA

Page 20, line 8, for *s e* read *see;* line 18, for *Doelling ri* read *Doellingeri.*

Page 23, line 10 from bottom, for *hanthoscarpa* read *xanthocarpa.*

Page 25, line 20, for *Lopho ia* read *Lophozia.*

Page 34, line 14, for *julaceous* read *julaceus.*

Page 40, line 21, for *32* read *31.*

Page 41, line 31, for *pendulous* read *dichotomous*, also set this line to the left so as to be coordinate with line 11, "Thallus erect."

Page 64, lines 7 and 8 from bottom, for *Lobadium* read *Lopadium;* line 6 from bottom, for *Cetraris* read *Cetraria.*

Page 79, line 7, for *Calypogea* read *calypogeia.*

Pages 81–96, September number, read *65–80.*

Page 90, line 14, insert 6. before *Dianthera* and center whole line.